Math 110-02, Graded Homewordk #6

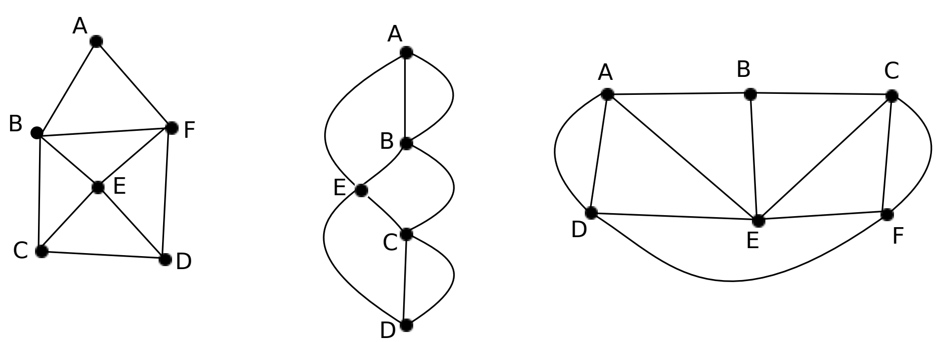
This homework is due next Monday, April 28, in class.

Part 1: Do the following exercises from Section 4.7: 4.7.6, 4.7.8, 4.7.9, and 4.7.10. Note that you will have to read the section to understand what is being asked in 4.7.9 and 4.7.10. Also, as a hint for 4.7.8.d, you might take a look at Exercise 4.7.16 (but without actually doing that exercise).

Part 2: In class, we considered what it might be like to live in a 3D space that is the three-dimensional analog of the surface of a torus. (This is as opposed to living in regular 3D space that extends infinitely in all directions.) We saw how such a space could be modeled by identifying each pair of opposite sides of a solid cube or "fish tank." Write a paragraph discussing in your own words what it would be like to live in such a space and how it would differ from living in ordinary, infinite 3D space.

Part 3: Do the following exercises from Section 6.1: 6.1.1, 6.1.10, 6.1.12.

Part 4: An *Euler circuit* traverses each edge of a graph exactly once and returns to its starting point. An *Euler path* traverses each edge of the graph exactly once; it does not necessarily return to its starting point. An Euler circuit is automatically an Euler path, so any graph that has an Euler circuit also has an Euler path. Are there any Euler paths that are **not** Euler circuits? Exercises 6.1.18 through 6.1.25 are about Euler paths, and they lead up to the following conclusion: A graph has an Euler path but no Euler circuit if an only if the graph is connected and has exactly two vertices that have odd degree. Such an Euler path must start at one vertex of odd degree and end at the other vertex of odd degree. *Find an Euler path for each of the following graphs*:



(**Note:** To show Euler circuits and paths, you can copy the graph and number the edges to show the order in which they are traversed. Or use the notation from the textbook.)